

A circular logo with a green border. The word 'ENERGY' is written in white capital letters along the top arc, and 'EFFICIENT' is written along the bottom arc. In the center is a stylized globe with green and blue segments. Overlaid on the logo is the text 'Connecting High Performance Buildings to High Performing Students' in black.

Connecting High  
Performance Buildings to  
High Performing Students

# What is a high performance school?

- *A high performance school provides a healthy environment*
- *A high performance school is comfortable*
- *A high performance school has as much natural daylight as possible*
- *A high performance school is energy efficient*
- *A high performance school is resource efficient*
- *A high performance school is stimulating architecture*
- *A high performance school is easy to maintain and operate*

# Studies

According to Dr. Glen Earthman's 2002 study,  
"School building design features and components have been proven to have a measurable influence upon student learning. Among the influential features and components are those impacting temperature, lighting, acoustics and age. Researchers have found negative impact upon student performance in buildings where deficiencies in any of these features exist."

# Studies

Audrey Kaplan, Stan Aronoff, (1996) "Productivity paradox

A building can have both positive and negative effects on performance.  
Negative effects are associated with discomforts, distractions or health risks that interfere with peoples' ability to do their work.

# Studies

California's Collaborative for High Performance Schools (CHPS)\* found a strong correlation between the increased use of daytime-lighting and improved student performance. In one California district, students in classrooms with the most daylight scored 20 percent higher on math tests and 26 percent higher on reading tests compared to students in classrooms with lower levels of daylight.



# Shelby County Southside Elementary

- Architect: K. Norman Berry Associates Architects
- Engineer: CMTA Consulting Engineers

# Southside Elementary Features

## **Architecture:**

- **Building Orientation** – Building is position so all classrooms face North & South. This minimizes solar loads on the building glazing.
- **Building Envelope** – The wall is an ICF wall that exceeds the IECC code insulation value by twice the minimum. The windows also were selected to surpass the code required minimum, reduce solar load, but increase daylighting of spaces. The roof insulation is a continuous insulation that exceeds the code minimum also.
- **Building Infiltration** – Spray foam was used to help seal up the building joints to provide an air tight building minimizing unconditioned air (infiltration) which improves building efficiency significantly.
- **Roof Color Selection** – Energy Star color to reduce solar load.
- **Two story building to minimize roof area and wall to footprint area.** Reduces envelope load increasing building performance.

# Southside Elementary Features

## Mechanical:

- **Geothermal Heat Pump systems utilizing two stage high efficient heat pumps for space conditioning.**
- **Dedicated outdoor ventilation system utilizing energy recovery.** VAV boxes are used for occupancy control. If the classroom occupancy sensor senses no occupancy, the VAV box shuts off outside air and puts the heat pump into unoccupied mode.
- **Geothermal Domestic Water Heaters** – Very efficient domestic water heating, utilizing summer water loop conditions to generate domestic hot water at COPs of 5.0 or higher. The unit will operate at a COP of 4 during winter conditions.
- **Utilization of free cooling to condition the MDF room.**
- **Kitchen Freezer and Coolers were installed on the geothermal loop,** with side stream pumps that allow for the units to operate without running the large building geothermal loop pumps.
- **Kitchen Hoods** – Type 2 warming hoods were utilized to reduce system airflow and make-up air.



# Southside Elementary Features

## **Electrical:**

- All building lighting is LED or high efficient T8 – 28 watt lamps. Lighting was designed at a lighting intensity of 0.8 watts per sqft which is less than the code maximum of 1.2 watts per sqft.
- Occupancy based control of all lighting except common lighting in corridors which is scheduled through the building automation system.
- All exterior lighting is LED.













# NEED Student Energy Teams

## Ensuring Future Efficiency

***Monitor their Schools for Efficient use of Energy***

***Mentor Energy Conservation Behaviors at school and home.***



NEED Students transform how they think of themselves, feel compelled to learn because they perceive themselves of substantial importance to their communities and receive support for their achievements.





Questions?